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Intervenor, South Carolina Solar Business Alliance, Inc., (hereinafter as, “SCSBA”), pursuant to Reg. 103-835 and Rule 33, of the South Carolina Rules of Civil Procedure, hereby serves, **Duke Energy Carolinas, LLC**, (hereinafter as, “DEC”) with Intervenor, SCSBA’s First Set of Interrogatories, to be answered separately within twenty (20) days from the date of service hereof. Please set forth DEP’s answers separately, after restating the question.

**IT IS HEREIN REQUESTED:**

1. That all information shall be provided to the undersigned in the format as requested.
2. That all answers to the below Interrogatories shall be labeled using the same numbers as used herein.
3. That if the requested information is found in other places or in other exhibits, reference not be made to those, but, instead, that the information be reproduced and placed in the answers to these Interrogatories in the appropriate sequence.
4. That any inquiries or communication relating to questions concerning clarifications of the data requested below be directed to the undersigned.
5. That all exhibits be reduced to an 8 1/2" x 11" format.
6. That each Interrogatory be reproduced at the beginning of the answer thereto.

7. That DEC provides the undersigned with responses to these Interrogatories (including any objections) as soon as possible, but not later than twenty (20) days from the date of service hereof.

8. If the answer to any Interrogatory is that the information requested is not currently available, state when the information requested will become available.

9. These Interrogatories shall be deemed continuing, so as to require DEC to supplement or amend its responses as any additional information becomes available up to and through the date of trial.

10. If a privilege not to answer an Interrogatory is claimed, identify each matter as to which the privilege is claimed, the nature of the privilege, and the legal and factual basis for each such claim.

11. If a refusal to answer an Interrogatory is based on the grounds that same would be unduly burdensome, identify the number and nature of documents needed to be searched, the location of the documents, and the number of hours and costs required to conduct the search.

12. Answer each Interrogatory on the basis of the entire knowledge of DEC, including information in the possession of DEC, or its consultants, representatives, agents, experts, partners, employees, independent contractors and attorneys, if any.

13. If any Interrogatory cannot be answered in full, answer to the extent possible and specify the reasons for DEC's inability to answer.

### **DEFINITIONS**

As used herein, the following terms shall have the meaning and be interpreted as set forth below:

1. **“You” or “your” shall refer to, DEC.**
2. **The conjunctions “and” and “or” shall be interpreted** in each and every instance as meaning “and/or” and shall in neither instance be interpreted disjunctively to exclude any document or information otherwise within the scope of any description or request made herein.

3. **“Document” shall mean** all originals of any nature whatsoever, identical copies and all non-identical copies thereof, pertaining to any medium upon which intelligence or information is recorded in your possession, custody or control, or other tangible objects regardless of where located; including, without limiting the generality of foregoing, punch cards, print-out sheets, movie film, slides, photographs, records, work papers, source documents, microfilm, notes, letters, memoranda, ledgers, worksheets, books, magazines, notebooks, diaries, calendars, appointment book registers, charts, cable, papers, agreements, contracts, purchase orders, acknowledgements, invoices, authorizations, budgets, analyses, projections, transcripts, minutes of meeting of any kind, correspondence, telegrams, drafts, data processing disks or tapes, or computer-produced interpretations thereof, instructions, announcements, schedules, and price list. Media includes data on computers, laptop computers, netbook computers, cell phones, telephones, PDA’s, Blackberry’s or Blackberry type devices, smart phones, external hard drives and flash drives or storage devices of any type, of DEC and specifically includes the computer and or laptop computers utilized by Representatives of DEC. Media means media, as broadly as the term “media” may be defined, that contains electronic data, as to the Interaction between SCSBA and DEC.

4. **“Identify” or “identity”** used with reference to an individual means to state his or her full name, present or last known address, present or last known position and business affiliation, and employer, title, and position at the same time in question.

5. **“Identify” or “identity”** used with reference to a writing means to state the date, author, type of document (e.g. letter, memorandum, telegram, chart, note, application, etc.) or other means of identification, and its present location or custodian. If any such document is no longer in your possession or subject to their control, state what disposition was made of the document(s).

6. The **“current review period”** means the historical time period for which fuel costs are subject to review in this proceeding, as defined by S.C. Code Ann. § 58-27-865(B).

7. A **“sub-portion” of the “current review period”** is any shorter time period encompassed by the review period (e.g. a specific day, week or month).

8. The **“forecast review period”** means the time period for which a forecast of Your fuel costs is subject to review in this proceeding, as defined by S.C. Code Ann. § 58-27-865(B).

9. A **“sub-portion” of the “forecast review period”** is any shorter time period encompassed by the review period (e.g. a specific day, week or month).

10. A **“forecast” or “forecasts”** is the result of a quantitative modeling process, or a prediction, or an estimate of what might occur, or an estimate of what is likely to occur in the future (at a time subsequent to the time when the forecast was prepared).

11. **“Production Costs”** are the cost of operating a generating unit to produce electricity, including (but not necessarily limited to) fuel costs.

12. **“Production Cost Models”** are software programs or system that are used in the electric power industry to analyze, estimate or forecast the amount of electricity that will be produced by fleet of generators, or individual generating units, during a specified time period, and the cost of producing this electricity (including but not necessarily limited to fuel costs) along with related information (e.g. the anticipated optimal dispatch order). Examples of Production Cost Models include PROMOD (See: <https://new.abb.com/enterprise-software/energy-portfolio-management/market-analysis/promod>) PROSYM (See <https://new.abb.com/enterprise-software/energy-portfolio-management/market-analysis/zonal-analysis>) AURORA (See: <http://epis.com/aurora/>) and GenTrader (See: <http://www.powercosts.com/wp-content/uploads/PCI-GenTrader.pdf>)

13. **“Duck Curve”** refers to the operational challenges associated with increased amounts of solar generation, as discussed in Your March 29, 2018 Allowable Ex Parte Briefing to the South Carolina Public Service, Commission (Proceeding No. 18-11715).

14. All references to the singular contained herein shall be deemed to include the appropriate plural number and all references to the plural shall be deemed to include the singular. All references to the masculine gender contained herein shall be deemed to include the appropriate feminine and neuter genders.

**FIRST SET OF INTERROGATORIES**

1. Please state whether you are forecasting increased amounts of solar energy on DEC's system during the forecast review period (relative to the current review period), and if so, please explain any efforts you anticipate making, or are currently considering, in an attempt to minimize Your fuel costs during the forecast review period, or in an effort to achieve the maximum feasible reduction in Your fuel costs during the forecast review period as a result of the availability of increased solar generation. Please include within your response an explanation of any steps you are taking, or anticipate taking, to optimize the dispatching of Your generating units, taking into consideration their "ramp rates" and other applicable constraints. Please also include an explanation of any steps you are taking, or anticipate taking, to modify or adjust the operation of Your pumped storage units.

2. Please explain in detail how the operation of Your pumped storage unit(s) affected Your fuel costs during the current review period. Please include in Your explanation how much electricity is used and generated during a complete cycle, including but not limited to how many MWh are required to fill the reservoir from empty (or another specified level) and how many MWh are generated when the reservoir is drained back down to that starting point (zero or another specified level). Please include in Your explanation how long (in hours and minutes) the pumped storage unit(s) can operate at its full nameplate capacity before the reservoir is emptied, and explain whether Your total fuel costs are increased or decreased by the operation of Your pumped storage units, on net balance.

3. Please explain in detail how You modeled the operation of Your pumped storage unit(s) in estimating Your fuel costs during the forecast review period. Please include in Your response an explanation of what assumptions and inputs You used to forecast the operation of each of Your pumped storage units. Please also explain how many MWh of electrical energy You forecast would be used to fill the reservoir of each pumped storage unit during the forecast review period, and how many MWh of electrical energy would be generated by each pumped storage unit.

4. Please explain in detail the circumstances under which You have forecasted that Your fuel costs will be decreased by the operation of Your pumped storage units (e.g. times when You forecast being able to reduce the amount of fuel burned during peak times by more than the amount of additional fuel you need to burn in order to fill the reservoir). Please also explain whether, why, and to what extent Your fuel costs are forecast to be increased by the operation of Your pumped storage units (e.g. more electricity is used filling the reservoir than is generated when the reservoir is drained).

5. Please identify each document responsive to the SCSBA's First Request for Production, Request Number 14, and explain the document and its purpose (e.g. why it was created and how it was used). If the document includes output from a Production Cost Model, please include in Your explanation what time period is encompassed by the output, and what input assumptions were used in preparing the output.

6. Please identify each document responsive to the SCSBA's First Request for Production, Request Number 16, and explain the document and its purpose (e.g. why it was created and how it was used). Please also include in Your explanation what time period is encompassed by the Production Cost Model output, and what input assumptions were used in preparing this output.

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/s/

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Columbia, South Carolina